DOCUMENT RESUME

ED 258 856 SO 016 513

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TITLE Are We Running Out of Everything? Series on Public Issues No. 1.
REPORT NO ISBN-0-86599-008-5
PUB DATE 83
NOTE 32p.; For related documents, see SO 016 514-527. Adapted from "Doomsday!:10,000 Years of Economic Crises" by S. Charles Maurice and Charles W. Smithson.
AVAILABLE FROM Public Issues, Center for Free Enterprise, Texas A&M University, College Station, TX 77843 ($2.00).
PUB TYPE Viewpoints (120)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS Capitalism; *Conservation (Environment); *Controversial Issues (Course Content); Decision Making; Depleted Resources; *Economics; Economics Education; Federal Regulation; *Government Role; History; Instructional Materials; *Natural Resources; *Public Policy; Secondary Education
IDENTIFIERS *Free Enterprise System; Oil

ABSTRACT

In the introduction to this booklet, one of a series intended to apply economic principles to major social and political issues of the day, it is pointed out that despite the predictions of "doom merchants," the world did not run out of oil in the 1970's, and in fact, is experiencing an oil glut in the 1980's. It is then argued that freely functioning markets with people acting in their own self-interest have eliminated shortages of oil. By looking at the oil crisis of the 1970's and earlier shortages in resources such as timber, whale oil, and flint, it is possible to see the operation of a free market system acting to use abundant resources and conserve scarce ones. Thus, this system will continue to act by encouraging individuals to conserve resources or seek new solutions whenever new shortages appear. In conclusion, it is argued that where difficulties have arisen, whether it be the oil crisis of the 1970's or the fall of the Roman Empire, the causes may be found in attempts by government to stifle the free enterprise system. It is then emphasized that the best that government can do is not to become involved in attempts to regulate the use of natural resources. (LH)

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ARE WE RUNNING OUT OF EVERYTHING?

S. Charles Maurice and Charles W. Smithson

This monograph is adapted from *Doomsday!: 10,000 Years of Economic Crises* by S. Charles Maurice and Charles W. Smithson.

Series on Public Issues No. 1

Published by the Center for Education and Research in Free Enterprise, Texas A&M University, College Station, Texas

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INTRODUCTION

In the decade of the 70's we heard over and over again that we were running out of oil. To get a feeling for the mood of the times, let's look at a few of the headlines from this period:

"Who Shut the Heat Off?", *Time*, February 12, 1973
"Summer 1973: The Economics of Scarcity", *Newsweek*, July 9, 1973
"Energy: How High is UP?", *Newsweek* (cover story), January 7, 1974
"A Long Dry Summer", *Newsweek* (cover story), April 21, 1979
"Over a Barrell", *Newsweek* (cover story), July 9, 1979

Some people — whom we like to call the "doom merchants" — even went so far as to predict that the "energy crisis" was going to lead to the collapse of the United States and the other Western societies. This particularly dismal tone was probably best reflected in the now-famous *Newsweek* cover from which we took our title.

"Are We Running Out of Everything?"
(November 19, 1973)

However, America certainly did not collapse as a result of the "energy crisis". Indeed, by the early 80's, there was a surplus rather than a shortage of petroleum on the world market. By 1982, the headlines had changed:

"Down, Down, Down: OPEC Finds That It Is A Crude, Crude World", *Time*, March 15, 1982
"OPEC Tries Again to Sop Up the Glut", *Newsweek*, March 29, 1982

Doesn't this look almost miraculous? In a period of less than 10 years, our situation changed from a critical shortage to a surplus. How did this happen? In the next section we will answer that question.

But, more importantly, we know that the world has weathered "resource crises" in the past. The only difference has been the resource we were "running out of". Most recently, it was petroleum. In other eras the critical resource has been timber, rubber, whale oil, charcoal, labor, and tin. Experts at the time were certain we were soon to run out of these resources and the social structure was doomed. But the experts were always wrong.

These past predictions of doom are particularly evident in the case of petroleum. In 1866, when the U.S. was producing less than 4 million barrels of oil a year, the U.S. Revenue Commission warned that synthetics would have to soon be used when the oil ran out. In 1885, when production was around 20 million barrels a year, the U.S. Geological Survey reported that there was almost no chance of oil in California. The

same survey stated in 1891, when production was slightly over 50 million barrels a year, that there was no oil in Texas.

And the predictions go on. The U.S. Bureau of Mines prophesized in 1914, with yearly production at 200 million barrels, that the total future production of oil was only 5.7 billion barrels. Less than 30 years at that rate of extraction. The U.S. Geographical Survey got back into the act in 1920, predicting that peak domestic production had been reached at 400 million barrels a year. In 1931 the Secretary of the Interior warned that the U.S. would soon have to resort to imported oil. Annual production was then about 750 million barrels. In 1934, when annual production had reached almost 1 billion barrels, the Interior Department forecast that oil supplies would last only 13 years. The Secretary of the Interior again warned in 1949 that the end of the U.S. oil supply was in sight. We were pumping almost 2 billion barrels a year at the time.

And you are certainly aware of the predictions of the 1970s. We constantly heard that the world was running out of oil. Just as was the case with the early forecasts of doom, these later predictions were also wrong. Over and over the experts have told us that we were going to run out of oil, but, over and over, they were wrong.

But forecasts of doom have existed for as long as civilization has existed. For example, a conservationist writing three decades ago argued that

> "... Within foreseeable time increasing consumption of resources can produce scarcities serious enough to destroy our American Dream..."

The important fact is, however, that *all of these forecasts of doom have been wrong*. Civilization has not collapsed due to the depletion of any resource. Instead, freely functioning markets with people acting in their own self-interest have eliminated the shortages.

This then is our theme: If markets are given the freedom to respond, people will react to shortages and the resulting increases in prices, thereby eliminating the "crises". We sincerely feel that the power of the marketplace can and will eliminate shortages and protect us from embargos by foreign suppliers. However, over the past years we have had a difficult time communicating our optimism to others, try as we would. This difficulty was especially evident in 1979. Faced with long gasoline lines and rapidly rising prices, most people were simply unwilling to accept the argument that a return to an unregulated petroleum market would end the shortage and result in lower gasoline prices.

Our faith in the ability of the market to eliminate crises is not based on metaphysics or even on the power of modern economic theory. Instead, it is based on the simple fact that the market has worked in the past.

Hence, in this monograph we are going to show you how the

market has indeed worked in the past. First, we will explain what got us into the energy crisis of the 70's and then explain how we got out of that crisis. Next we will show you how the same pattern took place in response to earlier resource crises. Then, in order for you to see the dangers of restricting the market, we will describe one circumstance in which a collapse actually occurred. Finally, we will look at our current "crisis" and see what we can expect in the future.

AMERICA'S MOST RECENT CRISIS

Before the 1970s, very few people were interested in energy except for ways to use it. Oil and energy got very little attention in the press — with the possible exception of some stories about the behavior of Texas oil millionares. Why? The answer is rather simple. Before 1970 — indeed, before 1973 — the *real* price (price net of inflation) of oil was declining. If we divide the prices of petroleum by the consumer price index, we obtain prices in terms of constant dollars, therefore eliminating the effect of inflation. In the following table, we have done this to obtain the *real* price per barrel in terms of 1967 dollars.

Real Oil Prices

	U.S.	World
1950	$3.48	$2.37
1955	3.45	2.03
1960	3.25	1.72
1965	3.03	1.41
1970	2.73	1.08
1975	4.76	6.65
1980	5.12	14.04

It is easily seen that the real price of oil *fell* from 1950 to the early 1970s. Is it surprising that the 50s and 60s was the era of the "gas guzzling" automobile in America? Is it snocking that homes built during this period were poorly insulated — energy inefficient? Of course not. If any product becomes cheaper, don't people use more of it? Don't you? Oil and heating oil are not exceptions. When oil was cheap, gasoline was cheap. As the price of gasoline fell, cars got bigger and less fuel efficient.

America wasn't "wasteful" during this period, in spite of the editorial criticism after prices rose in the 70s. People used more of the cheap resource, oil, to save on the expensive resources, time in the case of automobiles and building materials in the case of homes. This reaction is what we would expect.

But, during these "happy days" of the 50s and 60s some of the

seeds of the coming crisis were planted. Until the mid-70s the world price of energy was far below the U.S. price. During this period the U.S. was actively following a policy of restricting imports in order to "protect domestic producers" from the cheap foreign crude. Originally designed for national security, an oil import quota system was put in place during the Eisenhower administration (1959). The objective of the quota system was to limit imports to 12% of U.S. consumption. Faced with this quota system in the U.S., the countries exporting that "cheap crude" reacted. On September 14, 1960, Iran, Iraq, Kuwait, Saudi Arabia, and Venezuela organized OPEC. (In later years, the membership would rise to thirteen.)

At this time there was no crisis because there was excess capacity in production in the U.S. during the 60s. Had OPEC attempted to reduce imports, the shortfall could easily have been covered by domestic production. What then swung the balance of power to the foreign suppliers?

First, imports did not maintain a 12% share of U.S. consumption. Instead, the share was nearer to 20%. Foreign crudes were very attractive — they were cheaper. While this increase in the demand for foreign crude oils would have been troublesome in light of permitting OPEC more power, it would not have, in itself, led to a crisis. Instead, we would expect it to lead to higher world oil prices, resulting in domestic crude becoming relatively more attractive. Rather, it was a second factor that set the stage for the crisis. This factor was the price ceiling on petroleum.

In August 1971, the Nixon administration imposed a wage and price freeze. Think for a moment how this price ceiling affected the market for crude oil. Look first at domestic supplies. In order to obtain more energy, producers were being forced to use more and more expensive techniques. However, these more expensive techniques required that the producers get a higher price for the crude. Put yourself in their shoes for a moment. How long would you go on spending more and more to extract oil for which you could not charge a higher price? It is therefore not at all surprising that the peak of U.S. oil production had occurred in 1970. With the imposition of price controls, domestic production began its decline — a decline that would not be reversed until the next decade.

Next, let's look at the impact of the price ceiling on the consumption of petroleum. With declining production, consumption would also have to decline in order to avoid a shortage. Instead, consumption continued to increase at the same rate as during the cheap oil decade of the 60s. The price controls kept the price of gasoline and heating oil from rising; so Americans continued to use oil as if nothing had happened.

By this time the storm clouds were looming. The U.S. was faced with rising consumption and declining production. (Indeed it is precisely this realization that led many persons to predict a collapse of the

developed economies.) How then did we react to this situation? We imported more crude oil. By 1973, imports were approaching 30% of U.S. consumption.

What was OPEC doing during the early 70s? In 1969, the rich but feeble Libyan monarchy had been overthrown by Arab radicals led by Colonel Muammer al-Quadaffi. This political event marked a turning point in OPEC's position. Led by Libya, OPEC forced through a 21% price increase in 1971 and agreed to a program that would have amounted to a 52% increase (over the 1970 level) by 1976. OPEC was beginning to flex its muscles.

It was, however, in the winter of 1973 that OPEC found out the degree of their power. As a result of the Arab-Israeli War, an embargo was exercised in October. At that time, the posted price of Persian Gulf crude oil was $3.01 a barrel. By the end of the year, that price had risen to $11.65 — an increase of almost 300% in only 10 weeks! (So much for OPEC's 1971 goal of a 52% increase over 5 years). Although the embargo ended in March of 1974, the remainder of the decade was one of long gas lines, heating oil shortages, and OPEC price increases.

Faced with this crisis situation, how then did we, or more correctly our government, react? The obvious solution was to increase domestic production and decrease consumption. In 1975, President Ford proposed abolishing the price controls on crude oil. Decontrol would have stimulated domestic production. Instead, in 1975, Congress voted to continue the price controls.

How did we the consumers respond? During the embargo and immediately following, there was a massive movement toward energy efficiency. Small, fuel efficient automobiles were being sold at a substantial premium, while the large "gas guzzlers" sat on the lots. Homeowners began to insulate their houses and tried to reduce their usage of oil and electricity. However, once the memory of the embargo faded, the movement was reversed. With the government artificially holding down prices, Americans returned to big cars and then it was the small cars that were left on the auto lots. Gasoline consumption resumed its climb; consumption in 1978 was even higher than the pre-embargo record. Why then were there no gasoline lines between 1976 and 1979? The answer is simple. We imported more and more foreign crude oil. With domestic production stagnating under the price controls, imports rose to almost 50% of total U.S. consumption. With imports at this level, the events of 1979 were not at all surprising.

The turmoil in Iran in 1979 marked the beginning of the second period of gasoline shortage. Indeed, all this really did was to indicate the level of dependence on imports. With the cutbacks in foreign production and the resultant increases in the price of crude oil, once again Americans experienced the crisis elements. The worst of the energy crisis was upon us; a solution to the problem became essential.

But happily this was an instance in which it was indeed darkest before the dawn. The shortages of 1979 forced us to realize that price controls were a self-defeating strategy. There was no quick fix; no painless solution. Our energy problem could not be wished away or legislated away; it had to be faced. In the midst of a storm of angry protest from consumer groups, President Carter announced that, beginning in late 1979, oil price controls would be phased out with final decontrol in the fall of 1981.

By the end of 1980, imports had fallen by 25%. Both consumers and producers saw that, once again, the price of energy was to be controlled by supply and demand — not by government fiat. Consumers realized that the era of artificially cheap energy was over; so they began to conserve energy. The important point to realize here is that this was not just a panic reaction to short term shortages and gasoline lines — like the winter of 1973 — but rather it was a reaction to the fact that more and more oil could be obtained only at higher and higher prices. Faced with this realization, Americans began to conserve gasoline and other petroleum products. While this increased conservation is important, we should realize that earlier price increases by OPEC could have had the same result. With rising prices, the consumers would use less oil. It is, however, on the production side that the impact of deregulation was most pronounced. The rising price of crude oil made it feasible to drill deeper, use more expensive recovery techniques, and generally undertake more risky projects. Examples of the exotic new technologies include such things as infrared photographs taken from satellites to find promising exploration sites and horizontal drilling that permits wheel spoke patterns from an original hole to drain the oil more completely from a given area.

Deregulation was made complete by President Reagan in January of 1981 — nine months earlier than planned. What is the record since then? Consumption has dropped by 20%. On the other side of the coin, the drilling for new sources increased by 50%. Indeed, in 1981, the number of oil rigs working in the U.S. was almost double that in 1979; and, not surprisingly, this number is approximately 6 times the number of rigs working in 1971. The result has been that for the first time in more than a decade, petroleum reserves in the United States have risen. Apparently, decontrol has worked; let's see how it worked. Within a month following decontrol, the price of gasoline had risen about 10¢ per gallon, with heating oil increasing by about the same amount. The price of domestic crude oil jumped from $29 to $36 per barrel, a rise that indicated a forthcoming increase in the price of gasoline of another 14¢. However, by March, the oil companies found themselves in a situation that was unusual given their experience of the past decade — a surplus of oil products. They reacted as any market reacts; the major oil companies cut the price of oil products. Consumers were faced with a happy situation,

falling energy prices.

What then of OPEC? By summer, the major producing nations found themselves producing more than they could sell at the pre-deregulation price. With these stockpiles accumulating, prices had to drop. One has only to look at recent OPEC meetings to see the downward pressure on price. Decontrol of domestic crude oil broke the stranglehold OPEC held on America. As of now we have an oil glut rather than an oil shortage.

The Moral

In *Poor Richard's Almanac*, Benjamin Franklin said something about experience keeping a hard school. Since we have all had to suffer through the harsh experience of this recent energy crisis, we need to make sure that we have learned the lessons it taught. Let us summarize the most important of these lessons:

What caused the crisis? While OPEC raised the price of oil, it was we, not really some outside agent, who caused the crisis. Instead of permitting the marketplace to function, we (or our agents the government) attempted to keep the price of oil artificially low. In doing so, we caused consumption to increase and domestic production to decline. With this growing gap between domestic consumption and production, we placed ourselves at the mercy of foreign suppliers.

What eliminated the crisis? Here the answer is very simple: Our market economy eliminated the energy crisis of the 70s. Once the price mechanism was permitted to function — after a suspension of 10 years — the gap between domestic consumption and production began to narrow rapidly. With increasing energy prices, consumption declined. This conservation was accomplished by the consumers *substituting* other commodities for the relatively expensive energy. We substituted newer, more fuel efficient autos for those of an earlier decade. In our homes, we substituted insulation for energy. Firms also substituted capital for energy by switching from inefficient machines to more energy efficient machines. Hence, we argue that one of the primary factors is the *price induced substitution* away from energy. Looking at production, we saw that the rising oil price led to a massive increase in domestic exploration and drilling. The resulting increase in production can, to a great extent, be said to involve *price induced technical change*. As prices rose, the producers were induced to use newer and more expensive technology in order to drill deeper, drill in more difficult formations and locations, and extract more of the available deposit. Under the new technology, oil fields that were previously not counted as reserves began pumping oil. Hence, we feel that price induced substitution and price induced technical change are responsible for solving the energy crisis.

SOME CRISES FROM THE PAST

In our review of the "energy crisis" we hope that you saw that it was a functioning market — not some kind of government edict — that got us out of that jam. Indeed, it was the governmental restriction of the energy market that got us into the mess to begin with.

However, a question that might well be asked is: Was this situation with energy unique, or has the same sort of thing happened in the past? Our research tells us that there was nothing unique about the "energy crisis" of the 1970s. Resource shortages — crises — have occurred many times before and, if the market was permitted to function, they were always self-correcting. With a shortage, the price of the scarce commodity rises. Faced with higher prices, how would the consumers react? They try to use less of the good either through direct conservation, or recycling, or by switching to some alternative commodity. Conversely, the high prices stimulate suppliers by holding out the "carrot" of profit. Suppliers will try to produce more of the scarce commodity (as they did during the "energy crisis") or find and produce some alternative. The net result is that the shortage will be reduced; so, prices will decline.

To demonstrate this we are going to tell four stories about resource shortages that have occurred in the past. We are going to show how people responded to shortages. As you read these stories keep in mind the "energy crisis" of the 70s and the different ways consumers and suppliers can be expected to react to a shortage.

The Timber Crisis

At the turn of the century America experienced the greatest period of economic growth in its history — in the history of the world. But America was "running out" of one of the primary ingredients for sustaining this growth — wood. The reason was easily seen. We were cutting down our forests much faster than they could be replaced.

The railroads, the driving force behind the industrialization, were doomed. After all, the railroads accounted for twenty to twenty-five percent of annual timber consumption. Fifteen to twenty percent of the crossties, which required more wood than any other single product, had to be replaced every year. You can't run a railroad without wood.

A few headlines from the *New York Times* during the first decade of this century gave a picture of how we viewed the situation:

> "Timber Famine Near, Says Roosevelt, (and) National Forest Service. The President Repeats That One is Needed" — Jan. 6, 1905
>
> "Banish Christmas Trees, Dr. MacArthur Says This Heathenish Practice denudes Forests" — Dec. 7, 1908

"Urges Laws to Save Trees, Forests Will Be Wiped Out in Ten Years at Present Rate, Whipple Says" Dec. 16, 1908

The headlines — reminiscent of those in the 1970's — convey the feeling at the time. And the feeling was utter gloom. Really, banning Christmas trees to save wood. Was nothing sacred?

But there was clearly a problem in 1900. Public officials, the media, the President, and the informed public were justifiably worried about it. If people continued to consume timber at the same rate and if the growth rate of timber did not increase significantly, our forests would be quickly depleted.

What happened to the timber crisis? What caused it? More significantly, what ended it? How did such a serious national problem with such dire consequences become practically inconsequential? Face it. It was a serious problem but it did end — and in a relatively short period of time. Let's see what happened.

After the Civil War, America began the greatest economic expansion in history. In less than thirty years, the railroads spanned a continent. Prairie crossroads became towns, towns became cities, and cities became metropolises. The "robber barons" were investing and building industrial empires at an unprecedented rate.

It has been said that the nation was built with iron, but it was also built with wood. If the nation moved on iron rails, it also moved on wood ties. And Pittsburgh couldn't forge timber. Neither could Cleveland, Chicago, or New York. You had to grow timber; and that took time, a long time. We were using up our forests faster than they could grow. Why?

One problem, of course, was the depletion of Eastern forests to make room for farms prior to the Civil War. For a long time, the prevailing method of extracting timber was "clear cutting". This technique also led to forest fires, further depleting the forest. Furthermore, such cutting was not conducive to reforestation. Indeed, the railroads had switched from wood to coal for fuel by the end of the Civil War, partially as a result of this problem.

In America, timber was abundant and therefore cheap. Conversely, because of the relatively small population and the opportunities available in the frontier, labor was very expensive. So American business expended wood and conserved labor as it built a nation. Whenever possible, the abundant wood, land, and capital were substituted for the scarce labor. And Americans continued to do so, until wood became expensive.

The real wood users, the major depleters during this period were the railroads. From the 1870s to 1900, the railroads consumed up to one-fourth of the annual timber production in the United States. The

railroads being built across the prairies were much more wood intensive than the older Eastern railroads. Everything except the rails, spikes, car wheels, and locomotives was made of wood.

The reason was simple. These railroads were built through areas that were rather sparsely populated. To survive, they had to begin to yield a return on the investment quickly. So what would the owners do? Clearly they were induced to build rapidly, lightly and cheaply. There would be time enough to rebuild substantially when population and traffic increased. Also, both labor and capital were scarcer on the prairie and hence more expensive than in the East. These resources had to be carefully conserved.

Wood was the answer. It was light, easily worked, and, until the 1890s, cheap. And, it could be replaced and repaired more easily. So the prairie railroads began to use wood in great volume.

In 1896 timber prices began to rise. As the price of wood rose from 1896 to 1907, the relative price of substitutes, such as concrete and steel, fell. The railroads now began to adapt; slowly at first, rapidly later on.

At first the railroads, at the urging of the U.S. Forest Service, considered reforestation of the country as a remedy. Some railroads even went so far as to invest in forests. But they soon became increasingly disillusioned with the recommendations of the Forest Service. During this period they found that the real remedy lay in more efficient and more limited use of timber. Reduced consumption replaced increased production as the solution.

More and more the railroads turned to wood preservation and more efficient uses of timber. Many of the innovations were truly ingenious. Many new, more plentiful species of timber were found to be suitable for crossties after preservation was done. Research showed that hardwood ties, like untreated white oak, could be saved for steep grades, sharp turns, and heavy traffic areas where the ties wore out before they rotted. Treated softer woods could be used in less demanding uses. New, more efficient methods of sawing ties were found. These methods reduced the amount of wood used in a given tie. Furthermore, sawing instead of hewing the ties allowed wood that was previously scrap or chips to be used for boards and flooring. All sizes of trees could then be used for ties, whereas hewing of ties required the trees to be 11 to 15 inches in diameter.

In addition to rotting out, crossties wore out because of mechanical stress. From 1900 to 1914 many innovations were introduced to reduce the stress on ties. For example, tie plates and new types of fastening were designed to protect ties from wear. Different types of fastening and plates were added to protect the wood fibers. More scientific track design also was used to conserve wood.

From 1900 to 1914 the railroads paid a great deal of attention to substitution of other materials for wood. Iron, steel and concrete were

substituted in many uses. For example, there was a rapid shift from all-wood to all-metal cars between 1900 and 1914. There was a substitution away from wood in bridge construction. When wood was used in bridge repair and construction, it was treated wood, which lasted longer.

We could go on and enumerate the different methods the railroads used to adapt to higher wood prices. But there would be little point in doing so. By 1922 the problem was virtually solved. With the exception of a brief problem in housing, the wood shortages disappeared. Wood prices rose sharply between 1915 and 1920, then continued to rise gradually relative to the prices of alternative materials. But there was no alarm. Not many predicted a timber famine or forest exhaustion.

Was there a crisis? Certainly. Unquestionably, timber use could not have continued at the same rate without total depletion, and fairly quickly. There was a problem, and something had to be done. However, the U.S. Forest Service proved to be of little use. Consumers, led by the railroads, adapted their levels of consumption by technological change.

They substituted other materials for wood when the relative price of timber rose. Under the same incentive, they were able to extend the effective life of the wood they did use and to use wood more efficiently.

So market forces overcame this crisis. No one had to force consumers to economize and substitute. Just consumers wanting to make a profit, responding to scarcity and price change. The famine was over. As a matter of fact, it never really came.

America's First Oil Crisis

During the past decade, we have heard much about "alternative energy sources" and "synfuels". However, few people remember that petroleum is itself an "alternative energy source". Petroleum — or as it was called "rock oil" — was the alternative energy source of the nineteenth century. America's traditional fuel was not petroleum but rather was whale oil. When America was founded, it ran on and was illuminated by whale oil. We lubricated our machinery and fueled our lamps with whale oil. Why did we switch from whale oil to petroleum? Let's look at what happened some 125 years ago.

The first whaling in North America was done by Indians on the East and West coasts, long before Europeans arrived. The search for whales probably began with the killing of stranded whales, for which the Indians kept watch. After Europeans settled New England, they also kept watch for and killed stranded whales. Not long after the settlement of New England, American whalers began to go to sea, probably because fewer and fewer whales were becoming stranded in coastal bays.

The demand for whale products in England and the colonies increased rapidly during the first half of the 18th century. Consequently the price of oil from the sperm whale (the most widely hunted whale

and the best oil) rose substantially during the century until the beginning of the Revolutionary War. In 1731 the price of sperm oil was 7 pounds per ton; in 1774 it sold for 14 pounds per ton; by the end of the war the price was over 40 pounds per ton.

After the Revolutionary War the whaling fleet continued to increase rapidly. The number of ships peaked in 1846 when 729 American whaling ships were afloat. At the time the price of sperm oil was 88 cents a barrel and the price of other whale oil was 33 cents a barrel, still relatively cheap. But cheap oil couldn't continue. High volume whaling was rapidly depleting the raw material — the whales. The more whales killed, the fewer there were to reproduce. The birth rate declined dramatically, as you would expect. Spurred on by the declining whale population, the whaling ships sailed further and further from New England. Whaling became more and more efficient, but no matter how efficient the whalers were, the whales wouldn't cooperate by reproducing at a more rapid rate. Regardless of the efficiency of the whaling fleet, the whales just weren't there.

By the 1840's American whalers covered the sea. The Pacific was heavily hunted. During the 1830's and 1840's there would be at times more than 100 ships off the coast of Japan alone. And of course the heavy hunting clearly decreased the supply of whales even further. Once again, America was using up an important natural resource. And, as in the case for all natural resources, when the supply of whales decreased, the price of whale oil began to increase.

By 1850 the price of sperm oil had risen to $1.20 a barrel, and that of other whale oil to 49 cents, increases of 36 and 48 percent respectively over a four-year period. By 1856 the price of sperm oil had risen to $1.62, an increase of 84 percent over a ten year period; the price of whale oil went to 80 cents, an increase of 143 percent over the same period.

As you would expect, induced by the rising price of oil, even more ships went to sea to hunt the whales. Total ship tonnage employed in whaling increased from 171,484 tons (543 ships) in 1850 to a peak of 208,299 tons in 1854.

But increased hunting did not mean increased oil production for the whaling fleet. While the price of oil remained relatively high and the whaling fleet remained large, whales grew increasingly scarce and more difficult to find. Just before the Civil War, there seemed to be no solution in sight. How could a country fight a war without lubricants? Whale and sperm oil was "essential" and we were about to run out of it.

Of course, there was a solution in sight. As a matter of fact, the solution was just around the corner. As we know now, the solution was crude petroleum. And we know that petroleum quickly became not only superior to whale oil as a lubricant and illuminant but also cheaper.

Petroleum had been known since the dawn of time. People knew it could be used for caulking; and its medical properties were widely

known early in the 19th century. However, no one had really experimented with petroleum as an illuminant or lubricant when whale and sperm oil were so cheap. There was no need for a substitute. But the machine age began, the demand for lighting increased, and whales became scarcer. Consequently, the price of whale oil rose, and people began to search for a suitable substitute.

In 1853, George H. Bissell, a journalist and teacher, had become interested in what was then called "rock oil" when he became convinced that this oil would make an excellent illuminant. So convinced was he, that he purchased land on Oil Creek in Pennsylvania, an area known for its frequent oil seepages. Bissell and some other men joined together in the Pennsylvania Oil Company and were soon selling oil from seepages on their property at $1.50 a gallon.

bissell and some of his partners planned to drill for oil in 1857 using methods that others used to drill for water and salt brine. But, since some of the stockholders in the Pennsylvania Oil Company objected strenuously to the venture, Bissell reorganized the company as the Seneca Oil Company. He hired Edwin L. Drake, a retired railroad conductor, to drill a well on his property near Titusville, Pennsylvania. Drake hired William Smith, an experienced well driller, to carry out the actual drilling. (The crew consisted of Smith's two young sons). On August 27, 1859, late on a Sunday afternoon this group struck oil, made history, and changed the world.

After Drake's well came in, many others began drilling in the area. Very quickly well after well came in. Less than one year after Drake's well hit, oil was selling for $10 a barrel: but, at the end of 1861 it was selling for only 10 cents a barrel. By late 1860 there were 15 refineries in the area; three years later there were 61. The world's first oil glut occurred. The price was so low that people all over the country were introduced to oil as a cheap, efficient, and reliable illuminant and lubricant.

The demands of a rapidly expanding manufacturing industry increased the demand for oil. Production leaped from a rate of 1,200 barrels a day in 1860 to more than 5,000 a day in 1861. On November 14, 1861, landowners in the Pennsylvania oil field met to organize and take measures to "improve" the price of oil. All business was to pass through a central authority. At the next meeting the "Oil Creek Association" was formed to regulate production, and in January, 1862, the organization set the price of oil at $4 a barrel, up $3.90 from 1861. The first OPEC had emerged. At first they sold little oil. But by the end of 1862, because of the increased demand, the market price became $4 a barrel. The price steadily increased thereafter. It remained high though, not because of the loosely formed cartel, which soon broke up, but because demand kept increasing as people became more familier with the properties of oil. By the end of the Civil War petroleum was the sixth most important

export of the United States, ranking behind only gold, corn, tobacco, wheat, and flour. Certainly oil had become an important commodity, and it was destined to become more and more important over time. The previously all important whale industry was doomed.

A Crisis in Ancient Greece

When we were in school, we remember our teachers characterizing man's history in terms of three ages — the Stone Age, the Bronze Age, and the Iron Age. We want to look at the transition from Bronze to Iron. Specifically, why did our predecessors switch from bronze to iron tools and weapons? Certainly this transition represents a great advance in human history.

In Greece, the initial transition occurred in approximately 1000 B.C. Greece appears to be one of the first places in which iron became a "working metal" — i.e., Greece was one of the first places in which iron was used other than for ornamentation.

From trading records we know that, during the Bronze Age, iron was *extremely* expensive. For example, trading records from the 19th century B.C. suggest that the exchange ratio for iron and silver was *one iron to forty silver*. Bronze was far cheaper. During the Bronze Age, iron was so highly valued that there existed laws controlling its export. Indeed, its value can be illustrated with artifacts like a gold ring decorated with iron wire. In many regions of the ancient world, iron was so valuable it was used as money. Is it any surprise that no one was using iron as a working metal? When was the last time you used a gold bar as a hammer?

While the preceding discussion explains why the Greeks were using bronze rather than iron, it clearly does not help to explain the switch to iron that occurred after 1000 B.C. To answer this question, let's begin with another question: What exactly is bronze? It is an alloy of copper and tin or copper and arsenic. For obvious reasons, the Greeks (as did most others) used copper and tin. Some copper was available in the Aegean, but the primary source of copper for the Greeks was Cyprus. Tin, on the other hand, was not as abundant. There was no tin in Greece and practically none in the entire eastern Mediterranean area. Therefore, the Greeks had to trade with other nations to obtain tin. While the precise source of the tin is uncertain, it is likely that it came from Iran.

Since Greece allowed free trade, there were no governmental controls on metal prices. The price of copper or iron or tin varied with availability. And, about 1000 B.C., tin became almost nonexistent in the Aegean. The Greeks experienced a tin crisis, and hence a bronze crisis, of monumental proportions.

What caused the tin shortage? We know that all communication and trade in the Aegean were disrupted between 1025-950 B.C. For this period, there exists no evidence of any traded items. That is, the

archaeological record indicates that there was no trade taking place. Greece was isolated. The cause of this disruption in trade has been traced to the invasion of the "Sea Peoples" (e.g., the Philistines and the Dorians) into the eastern Mediterranean. Trade was no longer possible; and, as we noted earlier, without trade Greece had no tin.

With tin no longer available, bronze was no longer cheap. The shortage of tin raised its price and thereby the price of bronze. As the price of bronze rose, iron became a more attractive substitute. While tin was not available in the Aegean, iron ore was. Indeed, iron ore is spread liberally over the earth's surface. Thus, the rising price of bronze induced the ancient smiths to begin using iron. The age of iron had begun.

With the virtual elimination of tin supplies, the ancient Greeks began to use iron as a working metal. No longer was iron considered to be a precious metal to be used only for ornamentation. While iron was still expensive, its price had dropped relative to that of bronze.

However, we do not want to give you the idea that the Greeks completely stopped using bronze. It was, after all, the metal with which they had the most experience. It was the traditional resource. Indeed, once trade was reestablished in the Aegean, bronze prices dropped; so, we would expect many users to revert back to bronze. Bronze continued to be used for several more centuries. For example, we know that the Battle of Marathon in the fifth century B.C. was fought with bronze weapons. But — and this is the critical point — iron had made an inroad.

Even after the price of bronze declined toward its previous level, iron continued to be used. And, as the smiths worked more and more with iron, the experience they gained enabled them to make it more cheaply. By the 7th century B.C. the price of iron relative to silver was 2000 iron to one silver. Think about that for a moment. In the Bronze Age the iron: silver exchange ratio was 1:40. This later exchange ratio is 2000:1. That is simply a massive decline in price. More precisely, these two numbers indicate that the price of iron fell by *99.99* percent.

The ancient Greeks switched from bronze to iron because a resource shortage — a "tin crisis" — raised the price of bronze. They substituted a new product for the one that had become scarce. And, once they gained experience with the new product, they found ways of reducing the cost of production. Hence, competition reduced its price. In this way, the Greeks moved out of the Bronze Age into the Age of Iron.

Recycling in the Stone Age

In the 1970s, the word "guzzler" took on a very specific meaning. those of us who drive large automobiles are sometimes hesitant to admit it for fear of being labeled as a "gas guzzler". Indeed, we Americans have gone so far as to beat our collective breast and lament how we "wasted" gasoline and oil during the 60s. However, as we

demonstrated in the first chapter, the real reason we drove cars with poor gasoline mileage during the 60s was because gasoline was cheap. Quite simply, we reacted to the low price of the commodity by consuming more if it. When the price of gasoline began to rise in the 70s, our reaction was to move to more energy efficient automobiles — we switched from "guzzlers" to "conservers". Moreover, there was a move toward recycling goods that used a lot of energy in their production. An excellent example is aluminum. In the 60s, we discarded our aluminum cans because it was cheap to make more aluminum. However, when the price of energy rose and new aluminum became much more expensive, we began to collect and recycle our cans — a process requiring substantially less energy than the processing of new aluminum from bauxite.

We Americans changed from "guzzlers" to "conservers" and "recyclers" because energy got more expensive. Is this reaction unique to Americans or to so-called modern societies? Our research indicates that it is definitely not. Earlier, we presented some "more modern" evidence of this behavior. But, it is our assertion that all people — including primitive peoples — consume more of a good if it is cheap and consume less and resort to recycling if the good is expensive.

To provide some evidence bearing on this assertion, we will use an example drawn from a "stone age" people. Specifically, we use evidence from the artifacts deposited at two Maya villages that were located in what is now northern Belize.

The two sites we will describe are known as Colha and Pulltrouser Swamp. In the discussison that follows, remember that we are dealing with two villages occupied by members of the same population and located only 20 miles apart.

Let us look first at Colha. This village was located in a region in which flint was very abundant. Indeed, along a creek that flows through the site, you can still find large flint nodules measuring up to a meter across and almost half as thick. Flint was plentiful; so, it was cheap in terms of the effort required to get it. (By this, we mean that the people living at Colha had to expend very few resources in order to obtain flint.) How did the people who lived in Colha react? Put quite simply, they "guzzled" flint. Put yourself in their place for a moment. Suppose that you broke a spear point or a tool. What would you do? With flint being so plentiful, why not discard the broken implement and make a new one? This is precisely what the archaeological record left in the form of the flint artifacts indicates. Archaeologists working at Colha found large points and tools or else once-broken implements. There was almost no evidence of reworking to repair a broken implement or refacing of a tool or point that had dulled with use. The archaeological evidence indicates that the philosophy of Colha was to use then discard. Why not? With an abundance of flint, why would they conserve it?

At Pulltrouser Swamp, the people were farming using an elaborate

system of raised fields surrounded by irrigation ditches. (Quite a feat in itself.) More to the point, however, there were almost no flint deposits in the immediate region and the few that existed were of relatively poor quality. Flint was scarce; so, it was expensive — the people living at Pulltrouser Swamp had to expend more resources in order to obtain flint. How then did these people react? Let us go back to the hypothetical question we asked at Colha. Suppose a spear point or tool was broken. What would you do? Given that flint was scarce, you would have to repair the broken implement. The broken point could be reworked into a smaller but still usable point. In other words, the implement could be *recycled*. The archaeological record deposited at Pulltrouser Swamp indicates that this is exactly what happened. Researchers have unearthed almost none of the large implements characteristic of Colha. Instead, the artifacts discovered were much smaller and exhibited evidence that they had been reworked from larger implements. Also, these implements found at Pulltrouser Swamp showed substantial retouching — the edges had been resharpened. Thus, Pulltrouser Swamp provides evidence of recycling in the stone age. If an implement was dulled, it was resharpened. If an implement was broken, it was recycled into a smaller, but usable, implement. Even more, the small fragments of flint found exhibited patterns of wear. What does this imply? The small fragments of flint from a broken tool or point were not discarded but were collected, sharpened, and mounted in a handle to be used as tools, like scrapers. In the region of Pulltrouser Swamp, flint was expensive so the peoples of that region were "conservers" and "recyclers".

And these people didn't need western advisors to tell them what to do. They didn't need mass advertising to tell them to "Be Patriotic, Conserve Flint." Most of all they didn't need their government to set an artificially low price of flint so they wouldn't have to face the problem. They adapted just like others have adapted. They conserved the scarce resource. If these Stone Age People were able to adapt, what makes people think that modern men and women cannot. Aren't we as smart as the people of the Stone Age?

Recapitulation

What lessons can we learn from these four resource crises? Let's look at these crises again to see the different ways consumers and suppliers can react to the increase in price that comes with a shortage:

- In the timber crisis, the *consumers* reacted by *substituting* other materials for the scarce timber and by employing *technical innovations* to reduce the amount of timber needed.
- When the price of whale oil rose, *producers* were induced to provide an *alternative product*.

- In ancient Greece, the *consumers* of the scarce tin were induced to switch to an *alternative product*.
- For our stone age people, the high price of flint caused the *consumers to conserve and recycle* the scarce flint.

And there are many other such stories. At the beginning of World War II, the U.S. adapted to the crisis caused by the cutoff of crude rubber by the Japanese with synthetic rubber. In the early stages of the Industrial Revolution, Britain experienced a fuel crisis. But as they ran out of wood, they discovered how to use coal. During the late Middle Ages, the plague ravaged Europe, wiping out up to one-third of the population. As wages consequently soared because of the shortage of labor, industry found ways to substitute machine power for human power, and hence save the scarce resource, labor. We could go on, we are sure, but you get the idea.

These stories have illustrated the ways in which consumers and producers will respond to a shortage if the market is permitted to function. As you can see, the behavior of people 80, 125, or even 3000 years ago was not different from our own in the 1970s.

AN INSTANCE OF COLLAPSE

Throughout this description, we have been continually optimistic. We have asserted and we have demonstrated via our historical examples that, if the marketplace is permitted to function freely, shortages will always be eliminated; so, economic crisis need not lead to doomsday. However, we would be remiss if we left you thinking that there is absolutely nothing to worry about. Economic collapse is indeed possible — an economic doomsday could be in our future. But — and this is the crucial point — our survey of man's history indicates to us that it is only when the marketplace is restrained from operating that shortages can lead to collapse. Put another way, doomsday could arrive; but, it would only occur if we *invite* our own destruction by restricting the ability of the marketplace to function by excessive regulation.

As a case in point, let us consider ancient Rome. When most of us think of Rome, we think of "the glory that was Rome" under Augustus in the first century, A.D. What was responsible for this "glory" — or, more specifically, the robust economy during the height of Roman civilization? The answer is very simple. A freely functioning market was in place and was working. The emperor Augustus had no special economic policies. Indeed many historians point to Rome at this time as an example of laissez-faire policies. If a good became relatively scarce, its price rose; so, consumers demanded less, while producers brought more to the market or provided a substitute commodity.

What then led to the collapse of such a strong and vital economy?

Attempts to explain the decline and fall of Rome have been a preoccupation of historians for centuries. In what follows we do not purport to provide the *sole* reason for the collapse of the Roman civilization. Too many conditions existed to isolate a single cause as *the* reason for the fall. However, we hope to be able to convince you that the economic policies instituted during the latter period of the empire were definitely a major contributing factor to the collapse — doomsday did come to pass for Rome.

In contrast to the first century, Rome in the third century was a nation faced with numerous problems and shortages. In order to defend the far-flung boundaries of the empire, military service requirements had been increased and the state had resorted to confiscation of goods. Archaeological evidence indicates that the output of the empire had declined. The roads — the very lifelines of the empire — were deteriorating. (You might find it interesting that the road system built by the ancient Romans totaled 50,000 miles — 10,000 miles longer than our own interstate system.) The attitudes of the people changed from the optimism that had persisted for the past 200 years to sullenness. (Doesn't this all sound very familiar?) Immigration into the empire swelled its population. At the same time, agriculture — the basis of the economy — declined. Land had become concentrated in great estates. Soil productivity declined. Parts of the empire, like North Africa, were so impaired by over-cropping that they were unable to make deliveries.

Faced with these shortages — economic crises — what should the administrators of Rome have done? Our answer would be to let the marketplace work: If there is a shortage of chariots, let the price of chariots rise. With the price increase, some consumers would find other means of transportation (perhaps "chariot-pooling") and would tend to defer the purchase of a new chariot. At the same time, chariot makers would produce and sell more chariots. Moreover, persons producing other goods would be induced by the higher price to switch into making chariots. (While the example may be stretched, the principle is the same for any commodity.)

Instead, the administrators of Rome did *exactly the opposite!* Rather than making it easier for the market to function, the marketplace was virtually eliminated. The policies of non-interference by government in the economic life of the empire, which had proved so successful under Augustus, were abandoned in favor of rigid governmental control. Economic mobility was outlawed. Professions were made hereditary. Likewise, it became illegal to transfer capital from the production of one good to another. Returning to our naive example, how did these restrictions affect the production of chariots? If there was a shortage of chariots, no new producers could enter the market because such entry was *prohibited*. Hence, the production of chariots would fall; so, the shortage would be worse.

While the mobility restrictions were bad enough, it was Diocletian, the last of the strong emperors, who finally destroyed the marketplace in Rome. In 301, he issued an edict for universal wage and price controls. A maximum price was set for *every* good and service. Likewise, maximums were given for wages, fees, and stipends. The market was eliminated. In our first chapter, we described our recent experience with price controls on petroleum. Given those experiences, can you imagine the effects of price controls on *everything?* With price controls, the shortage of chariots we have used as an example would only get worse and worse. Without the price increase, there are no incentives for consumers to conserve or for producers to bring more to the market.

What then were the effects of the mobility restrictions and the wage and price controls on Rome? Productivity and consequently the standard of living declined. Where was the incentive to work harder or to innovate? Some free men even elected to become slaves, reasoning that it was better to be a slave (with someone else responsible for room and board) than to try to make a living in such a controlled state. Customers became fewer. Many large industrial concerns disappeared, while others were transferred to state ownership. The economy was dying.

Although historians date the end of Rome with the retirement of the last emperor in 476, Rome as a major civilization had died much earlier. Given the economic conditions we have described, do you feel that it is necessary to appeal to the idea of the "barbarians from the north" at the gates in order to explain the fall of Rome? We do not. To us, it is apparent that Rome invited the collapse by suspending the marketplace.

Therein lies our warning. We have shown you several examples of how economic crises have been eliminated by letting the market work. Now, we have shown how an economic crisis contributed to the collapse of a civilization because the market was not permitted to function. Today and in the future we will again face that choice. In the next section we will look at a current "crisis" in America and use it to point once again to the solution to "economic crises".

TODAY AND THE FUTURE

In the preceding chapters we have described some economic crises experienced in the past. We hope you have seen what are, we feel, the two most important points concerning economic crises.

First, economic crises — or periods of scarcity — are more common than unique in the history of man. Crises have occurred due to both a cut off of external supplies and, more simply, the depletion of a resource. If we have had shortages in the past, can't we expect more in the future?

Second, if people are allowed to pursue their own self interest, the

price of the resource will increase and the shortage will be eliminated. In our examples we have seen that shortage-induced price increases have led to substitution away from the scarce commodity and/or technological change. Since this has happened many times past, we fully expect that it can and will happen in the future.

Hence, we feel that economics is indeed the "optimistic science". While we do expect that we will continue to be confronted with more economic crises in the future, we are certain that, if markets are permitted to function, these crises will be eliminated.

And Not a Drop to Drink

For example, we have begun to hear more and more about an impending crisis that is potentially much more devastating than the "energy crisis". As described in the following headlines selected from the popular press, we Americans are being told that we are "running out of water":

"The Water Crisis: It's Almost Here", *Forbes*, August 20, 1979
"What to Do When the Well Runs Dry", *Science*, November 14, 1980
"Water: Will We Have Enough to Go Around"; *U.S. News and World Report* (Cover Story), June 29, 1981
"Water, Water, Running Out", *The Nation*, June 12, 1982

Don't these headlines look a lot like those we saw concerning energy? However, this similarity shouldn't be surprising. As we have demonstrated, all "resource crises" have much in common. It might be that the newspapers and magazines simply reuse old "crisis" headlines, changing only the resources — e.g., from energy to water.

The reports of the impending "water crises" do however have a particularly dismal tone. In this instance, the prophets of doom remind us that we humans can not exist without water. Their predictions of collapse seem even more self-evident than those we heard concerning the energy crisis — if we run out of water, we die.

We hear the experts predicting depletion — in the same way that other experts predicted the depletion of our oil reserves —

> "... by the year 2000, only three of the 18 federally designated water regions on the U.S. mainland will be able to live comfortably with their water supplies."

If these experts are correct, a lot of the rest of us are in big trouble. A particularly troublesome area is the important agricultural region watered by the Ogallala aquifer, a vast underground reservoir, extending 160,000 square miles under eight states — Texas, New Mexico,

Oklahoma, Colorado, Kansas, Wyoming, Nebraska, and South Dakota. This section of "the great American desert" accounts for nearly 12% of America's cotton, grain sorghum, and wheat. Further, almost one half of our beef cattle are fattened here.

The Ogallala Aquifer was first tapped in the 1930s. It was, however, the invention of the deep well turbine pump following World War II that transformed the face of our "American desert". These high capacity pumps made irrigation feasible — i.e., lowered the cost of raising the water from underground — and transformed the region from dryland farming into an intensive farming economy based on irrigated feedgrains, cotton, and wheat. In 1949, less than one tenth of the cropland was irrigated. This percentage rose to one sixth by 1959, to one third in 1969, and to one half in 1974. Over the last three decades the number of wells in the area increased from 2,000 to over 70,000.

The increase in irrigation certainly suggests that we might well pump out all of the water in this aquifer. The fact that the water was cheap induced the farmers to use a lot of it. What then happened to the stock of water contained in the aquifer? Since large scale irrigation has existed longer in Texas than in any other state watered by the Ogallala Aquifer, let's look at what happened there. In the 1930s it was estimated that there were some 485 million acre feet — an acre foot is the amount of water that would cover one acre to a depth of one foot — in the portion of the aquifer underlying Texas. By 1980, it has been estimated that the remaining deposit holds some 375 million acre feet — a reduction of 23%. If this rate of extraction were to continue, the doom merchants would be right — we would exhaust the Ogallala. If conditions remained as they were...

But, as in all the other crises we have discussed, conditions are changing. As more and more water was extracted, the price of water increased. In the 1970s and 1980s the cost of extracting water from this aquifer has increased radically. The first reason for this increase in cost is the simple fact that, as more of the water was pumped out of the aquifer, farmers had to drill deeper and lift further to get any additional water. The water table in the Ogallala aquifer has generally declined. The decline in the water table is most pronounced in Texas — the state where irrigation has been used the longest. In one Texas county, the water table has dropped by more than 150 feet since the 1940s. In 1948, only 17.5% of the wells in Texas were at depths of 150 feet or more. By 1977, over 90% of the wells were at this depth. As the water table dropped, it became more expensive to extract the water.

A second reason for the increased cost of water for irrigation was the rise in energy prices experienced in the 1970s. A huge proportion of the cost of irrigation is the cost of energy. With the increase in the price of energy, it became more expensive for the farmer to run the pumps to lift the water to the surface. When energy prices were low, water was

cheap. After energy prices rose, water became much more expensive.

These two factors — falling water tables and increased energy prices — increased the cost of water to the users. How then did the users react? As have the consumers of all the resources we discussed earlier, these consumers of water reacted to the price increase by reducing consumption. The increase in price induced substitution and technical change. Farmers have switched to more efficient irrigation techniques, including drip irrigation. Run off is being reduced through more efficient plowing. Chemicals have been developed that reduce a plant's need for water.

While there are other examples — like switching from water-intensive to less water-intensive crops and the use of lasers to allow for more precise contouring of the field — we hope that you have seen our point. As the price of water has risen, farmers in the region of the Ogallala Aquifer have reacted by consuming less water. This price-induced conservation has been accomplished through substitution and new technology. Water is not unlike any of the other resources we have considered -- if the price rises, users will consume less of it.

The net effect is that water use from the Ogallala Aquifer is *not* continuing according to historial trend. Through the 1960s, the water table had been declining at a rate of from 2 to 5 feet per year. The doom merchants observed this trend and then predicted that if the rate of drawdown continued, we would quickly exhaust the aquifer. However, this rate of decline did not continue. In the 1970s the rate of decline in the water table had been slowed to 1.42 feet per year. Even more significantly, the rate of decline in 1981 was only 0.37 feet per year. It would appear then that doomsday for the Ogallala Aquifer has been averted.

In general, we are very optimistic about the future for water. If the market is permitted to function we see no impending "water crisis". It is important to note that our optimism is not based on governmental involvement. Indeed, we want to see governmental restrictions removed. One thing we certainly do not want is the establishment of a "Department of Water". This view is certainly not universely held. Writing in *The Nation*, Fred Powledge made a plea for more governmental involvement:

> "... government, so far, has been an abject failure at recognizing the water crisis, planning for it, protecting its citizens against it, informing them of it or figuring out what to do about it."

Mr. Powledge definitely wants government to somehow coerce us into conserving water by measures such as "not flushing a toilet" and "taking a plastic bucket into the shower with you to catch the runoff". We adamantly oppose such an idea. Notwithstanding the enormous enforcement costs of such policies (a policeman in every bathroom?), we

think that they are simply unnecessary. In a free market, if water is scarce, its price will rise and consumers will conserve automatically. We need only to look at our experience in the 1970s to see this demonstrated. All of the crises we have told you about were solved by the market, not by government. Our assertion is then that governmental involvement is not necessary. We do not want the government to "do something". Indeed, given our experience with price controls on petroleum in the 1970s, we are very afraid that governmental involvement is the very thing that changes a normal shortage into a *crisis*.

A Prescription for Resources Crises

By this time we feel sure that you already know what our prescription is for combating resource crises; but, let us take just a few more moments to provide a final summary of our position. As we told you in the preceding section, we are now hearing that "we are running out of water". We also hear some experts telling us that "the energy crisis is not over". And these are only two of the resource crises that we can expect to face in the not too distant future. We have argued that resource shortages — crises — are not unique events. We have faced them in the past and it is all too clear that we will face them again in the future. We Americans must be ready.

The primary lesson of all we have described to you is extremely simple: *As long as the marketplace is permitted to function, shortages will be self-correcting*. Faced with higher prices for the scarce commodities, consumers and producers have always and will always react in such ways as to eliminate the shortage. Therefore, in order to ensure that we don't "run out of everything" we need only insure that the marketplace is allowed to function.

What does this then imply about the proper role of government in dealing with a resource shortage? Since we assert that it is private consumers and producers who drive the system, we would argue that government's role is very limited. In order to ensure that the market is permitted to function, government's job is to provide the infrastructure — like courts — and to use its antitrust power to avoid monopolization.

However, past experience has shown us that there are several things that government should *not* do if we are faced with a resource shortage. Think again about the timber crisis of the early 1900s. Was it the Forest Service that eliminated this crisis? Certainly not. Indeed much of what the Forest Service did during this period was counterproductive. Look at the Department of Energy during the more recent energy crisis. How much credit for today's petroleum situation do you give to this governmental agency? We would argue very little if any at all. Indeed, like the Forest Service in the early 1900s, much of what was done by the Department of Energy in the 1970s was counterproductive. When we are again faced with another resource shortage, should we set

up a Department of... or a bureau of... ? Past experience certainly does not suggest that it would be useful. Remember, it has always been the actions of individuals — not government agencies — that have eliminated resource shortages.

Even more importantly, it is essential that government not attempt to "legislate away" a crisis. In a period of shortage, as the price of the scarce commodity begins to rise, it is all together too tempting — particularly in the political arena — to "fix" the problem by controlling price. Remember what happened to us when we controlled the price of petroleum. Even more, remember what happened to Rome. Price controls never eliminate a shortage. Instead, price controls can turn a shortage into a crisis and can lead to a collapse.

Hence, when next we are faced with a resource shortage and you begin to hear the demands for government to "do something", we hope you will remember our stories. History has taught us that the only way to survive a "crisis" is to permit individuals to pursue their own self interests in an unfettered market.

The American free enterprise system, traditionally rested on three premises; the right of ownership, contractual freedom, and limited government. These premises generate predictable human behavior, yet behavior consistent with liberty and efficiency. Indeed, the American free enterprise system produces a standard of living and a degree of personal freedom that no other system (or country) has been able to duplicate.

The purpose of the Center for Education and Research in Free Enterprise is to enhance public understanding of individual liberty and the American Free Enterprise System through education, community involvement and research.

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